

Unwillingness to pay for privacy: a field experiment

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**Unwillingness to Pay for Privacy:
A Field Experiment**

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Verhalten auf Märkten**

ABSTRACT

Unwillingness to Pay for Privacy: A Field Experiment *

by Alastair R. Beresford, Dorothea Kübler† and Sören Preibusch

We measure willingness to pay for privacy in a field experiment. Participants were given the choice to buy a maximum of one DVD from one of two online stores. One store consistently required more sensitive personal data than the other, but otherwise the stores were identical. In one treatment, DVDs were one Euro cheaper at the store requesting more personal information, and almost all buyers chose the cheaper store. Surprisingly, in the second treatment when prices were identical, participants bought from both shops equally often.

Keywords: privacy, willingness to pay, field experiments

JEL Classification: C93, D12

ZUSAMMENFASSUNG

Keine Zahlungsbereitschaft für Datenschutz: Ein Feldexperiment

Wir messen die Zahlungsbereitschaft für Datenschutz in einem Feldexperiment. Die Teilnehmer konnten maximal eine DVD bei einem von zwei Online-Shops kaufen. Einer der beiden Läden verlangte immer mehr sensitive Daten als der andere, aber abgesehen davon waren die Läden gleich. Im ersten Treatment waren alle DVDs genau einen Euro günstiger bei dem Laden, der mehr sensitive Daten abfragte, und fast alle Käufer wählten diesen günstigeren Laden. In einem zweiten Treatment mit identischen Preisen bei beiden Läden kauften die Teilnehmer überraschenderweise bei beiden Läden gleich häufig.

*

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Unwillingness to Pay for Privacy: A Field Experiment*

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Abstract

We measure willingness to pay for privacy in a field experiment. Participants were given the choice to buy a maximum of one DVD from one of two online stores. One store consistently required more sensitive personal data than the other, but otherwise the stores were identical. In one treatment, DVDs were one Euro cheaper at the store requesting more personal information, and almost all buyers chose the cheaper store. Surprisingly, in the second treatment when prices were identical, participants bought from both shops equally often.

Key words: privacy; willingness to pay; field experiments.

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1. Introduction

The economics of privacy is controversial. The Chicago School (Posner, 1981) argues that privacy protection harms efficiency. In contrast, it has been asserted that property rights over the private data of individuals lead to the efficient outcome (Shapiro and Varian, 1997). But this view is contested, too. First, privacy may lead to efficient equilibrium outcomes even if people do not appreciate it individually (Hermalin and Katz, 2006; Wathieu 2009). Second, many contracts involving personal data are incomplete or highly opaque, as they typically lack clear-cut information about secondary uses and sharing of personal information, thereby limiting consumers' ability to understand what their data are used for, even retrospectively. Up to now, economists have not systematically studied choices regarding privacy in such environments.

It has been observed that consumers express concerns regarding misuse of personal data yet continue to provide personal data on social networks and online shopping sites.¹ To understand this behavior, observations from a natural environment have the disadvantage that the (unobservable) cost of switching to another supplier affects choices. Relatedly, present-biased preferences have been put forward as an explanation of inconsistent privacy choices (Acquisti, 2004). In our experiment, we are able to control for both explanations as there are two competing online stores that differ with respect to the mandatory data collected, and buying at the more privacy-friendly store does not prolong shopping time nor does it affect delivery time.² Moreover, we do not draw attention to the issue of privacy as a whole (as in Tsai, 2007, where privacy ratings in search engines encourage consumers to choose more

¹ See for example Acquisti and Grossklags (2005).

² In an experiment by Berendt et al. (2005) with a monopoly online store, present-biased preferences are a potential source of observed privacy choices.

privacy-friendly companies despite higher prices), but simply confront consumers with different data requirements at the two shops.

2. Experimental design

Participants were given the opportunity to buy one DVD from one of two online stores, named “SilverDisc Frankfurt” and “SilverDisc Cologne”. SilverDisc is a multichannel retailer of DVDs selling through Amazon, its own online shop, and a local branch in Berlin. The two branches in Frankfurt and Cologne are fictitious, but were chosen (with consent from SilverDisc) to minimize any differences between the two stores. All personal data provided by participants were given to SilverDisc and to Amazon as part of the transaction to purchase the DVD; this was explained in the instructions. On the order form, participants ticked a box to confirm they agreed with the data protection regulations and general terms and conditions of SilverDisc and Amazon, which were available upon request from the experimenters.

A selection of DVDs was presented to the participants and listed on two order forms, one for “SilverDisc Frankfurt” and one for “SilverDisc Cologne”, that were presented side-by-side to minimize search costs.³ Participants were also free to search via a desktop computer for other DVDs and print new order forms. Two treatments were conducted. In both treatments, the mandatory data items for the two online shops were kept constant. While last name, first name, postal and email address were mandatory for both shops, “SilverDisc Frankfurt” also required a date of birth and monthly income, whereas “SilverDisc Cologne” asked for the year of birth and favorite color as mandatory fields.⁴ In treatment EQ, the prices at the two shops

³ Instructions and order forms are posted on <http://www.wzb.eu/mp/vam/publications/journals.de.htm>.

⁴ Neither Amazon nor SilverDisc ask for income and favorite color. Thus, these data items had not been provided before by subjects who had already shopped at the online stores (75% with Amazon and 11% with SilverDisc).

were equal, whereas in treatment DIF all prices at “SilverDisc Frankfurt” were exactly one Euro less than the prices at “SilverDisc Cologne”. Thus, in DIF there was a trade-off between data requirements and prices as subjects found information on personal income more sensitive than on favorite color (see Section 3).

After subjects had made their purchase decision, they were asked to answer a post-experimental questionnaire. Apart from some general questions, we asked participants how willing they are in general to provide personal data such as income and favorite color as well as other items. And we asked those who made a purchase how satisfied they were with the chosen store regarding privacy and price.

All 225 participants in the experiment (students from the Technical University Berlin) received a show-up fee of 6 Euros which they received regardless of whether they made a purchase. In addition, all orders were subsidized by a discount of 7 Euros. The quoted price on the order form corresponded to the Amazon.de retail price plus the Amazon.de shipping costs (3 Euros) minus 1 Euro for “SilverDisc Frankfurt” in treatment DIF.

3. Results

Of the 225 participants, 74 made a purchase.⁵ Table 1 provides an overview of the results from both treatments DIF and EQ. In DIF, 39 of the 42 purchases were made at “SilverDisc Frankfurt” where prices were 1 Euro lower. Thus, participants predominantly chose the firm with the lower price and the more sensitive data requirement, indicating that they are willing to provide information about their monthly income and date of birth for a 1 Euro discount.

To establish a benchmark of privacy concerns in purchasing decisions, we conducted treatment EQ in which the two firms asked for the same price, but differed with respect to the

⁵ Less than 9% of the non-buyers mentioned privacy concerns or lack of trust as the main reason for not buying while the majority indicated the product or its price.

data items required for the transaction. In this treatment, approximately the same number of participants purchased a DVD at “SilverDisc Frankfurt” and “SilverDisc Cologne”. Thus, the more privacy friendly firm failed to attract more customers even though prices were equal at both stores.

The results of treatment EQ are surprising given the preferences over mandatory data items provided by subjects in the post-experimental questionnaire (Table 2). In treatment DIF, the fact that 32 out of 39 participants shopped with Frankfurt but reported a lower willingness to report income (required by the Frankfurt branch) than favorite color (required by the Cologne branch) can be rationalized with the price difference. However in EQ, 8 of the 15 customers of Frankfurt said they were less happy providing the data required by Frankfurt than by Cologne (with 6 being neutral and 1 preferring to provide the data asked for by Frankfurt).⁶ In addition, we asked customers to rate their satisfaction with price and privacy policy of the chosen store (see Table 3). All Frankfurt buyers in EQ who responded to a question concerning satisfaction with the privacy practices of Frankfurt (13 of 15) were dissatisfied.⁷

The results can be explained if participants (mainly students) are unconcerned about privacy issues. However, in the post-experimental questionnaire 75% of the participants indicated that they have a very strong interest in data protection, and 95% said that they are interested in the protection of their personal information. Thus, participants’ concerns were slightly higher than those reported in the Eurobarometer Survey (Gallup, 2008).

⁶ This is evidence against the hypothesis of private benefits or indifference when providing personal information, but collective costs in our setup (Wathieu 2009).

⁷ Table 3 also shows that participants noticed the difference in data requirements and prices between the two firms. Those who shopped with Cologne in treatment EQ were significantly more satisfied with the firm’s privacy policy than those who shopped with Frankfurt. In treatment DIF, those shopping with Frankfurt were significantly happier with the prices than those shopping with Cologne.

Providing false information is one method of protecting personal information. But except for one student who did not indicate his income, all subjects provided values that were reasonable in magnitude.

4. Conclusion

The experiment demonstrates an unwillingness to pay for privacy as the vast majority of subjects provide their monthly income for a price discount of one Euro. Even without a price discount, only half of the subjects shopped with the more privacy-friendly branch of the DVD retailer. This result is surprising given that most subjects who provide sensitive information are dissatisfied with it. Thus, observed behavior can neither be explained by a lack of awareness of privacy issues, nor can it be rationalized as a resolution of the trade-off between price and data protection in favor of price.

Two interpretations are possible: either the stated dissatisfaction with data collection and privacy protection can be regarded as uninformative as it is uncorrelated with choices, or behavior in the experiment is not in line with revealed-preference theory. In the latter case, the results shed doubt on the view that pure assignment of property rights in personal information is sufficient to achieve efficiency.

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TABLES

Table 1. Number of purchases at the two stores per treatment.

Treatment	“SilverDisc Frankfurt” (income/date of birth)	“SilverDisc Cologne” (favorite color/year of birth)
DIF	39	3
EQ	15	17

Table 2. Sensitivity of mandatory data items.

		Less willing to provide information on		
Treatment	Bought at	Favourite color	Income	Neutral
DIF	Cologne	0	3	0
	Frankfurt	0	32	7
EQ	Cologne	0	17	0
	Frankfurt	1	8	6

Note: This table reports on the answers to the question “When you are asked for data, how willing are you to provide the following items?” Income and favorite color were listed among a number of other items.

Table 3. Absolute frequencies of satisfaction after purchase decision.

Treatment		Bought at	Satisfaction High	Satisfaction Low	Significance (Fisher's Exact)
DIF	Price	Frankfurt	24	12	p=0.05
		Cologne	0	3	
	Privacy	Frankfurt	10	27	p=0.21
		Cologne	2	1	
EQ	Price	Frankfurt	2	10	p=0.67
		Cologne	4	12	
	Privacy	Frankfurt	0	13	p=0.05
		Cologne	5	11	

Note: This table reports on the answers to the question “How satisfied are you with the chosen store regarding price and privacy?” (Satisfaction values z-transformed; missing data for participants exactly between high and low; p-values two-tailed).



Frankfurt Branch

Your Order

I would like to order the free-delivery products marked below.
I will receive an additional **€7 discount** today from the given prices.

<input type="radio"/> Gran Torino	€ 11,95
<input type="radio"/> Hannah Montana - Der Film	€ 16,95
<input type="radio"/> 24 - Season 7 (6 DVDs)	€ 43,95
<input type="radio"/> Ice Age 3: Die Dinosaurier sind los (& Digital Copy)	€ 9,95
<input type="radio"/> Illuminati	€ 14,95
<input type="radio"/> Ice Age 1, 2 & 3 (3 DVDs, inkl. Digital Copies)	€ 21,95
<input type="radio"/> Stargate Atlantis - Season 5	€ 36,98
<input type="radio"/> David Garrett - David Garrett Live - In Concert & in Private	€ 18,95
<input type="radio"/> X-Men Origins: Wolverine (Extended Version inkl. Digital Cop	€ 16,95
<input type="radio"/> Mamma Mia!	€ 9,95
<input type="radio"/> Stromberg - Die Bürographie (Staffel 1-3)	€ 22,95
<input type="radio"/> Schöne Bescherung	€ 9,95
<input type="radio"/> Selbst ist die Braut	€ 19,98
<input type="radio"/> Star Wars - Trilogie, Episode IV-VI (3 DVDs)	€ 26,95
<input type="radio"/> Australia	€ 11,95
<input type="radio"/> Transformers 2 - Die Rache	€ 16,95
<input type="radio"/> Star Wars Trilogie: Der Anfang - Episode I-III	€ 26,95
<input type="radio"/> Two and a Half Men: Mein cooler Onkel Charlie - Die komplet	€ 11,97
<input type="radio"/> Terminator - Die Erlösung	€ 10,97
<input type="radio"/> Nachts im Museum 2 (inkl. DVD mit Digital Copy)	€ 16,95
<input type="radio"/> Marley & Ich	€ 11,95
<input type="radio"/> Stromberg - Staffel 4	€ 29,95
<input type="radio"/> Willkommen bei den Sch'tis	€ 14,95
<input type="radio"/> Twilight - Bis(s) zum Morgengrauen (2 DVDs)	€ 16,95
<input type="radio"/> Loriot - Vollständige Fernseh-Edition (16 DVDs) inkl. 50 noch	€ 31,95
<input type="radio"/> Star Trek	€ 16,95
<input type="radio"/> Harry Potter und der Halbblutprinz (1 Disc)	€ 14,97
<input type="radio"/> Slumdog Millionär	€ 15,95
<input type="radio"/> Hangover	€ 11,95
<input type="radio"/> Krabat (Einzel-DVD)	€ 11,95

Delivery Choices

☐ nine-day postal delivery

☐ four-day postal delivery (quick delivery)

For the quick delivery we need your identification details:

Document: Number:

☐ Gift-wrapped (plus €3)

Your Details

Required fields are marked with an asterisk.
You can pay by direct debit or in cash to the experiment supervisor.

* Sex (m/f)	<input type="text"/>
* First name	<input type="text"/>
* Surname	<input type="text"/>
* Street, House number	<input type="text"/>
* Postcode, City	<input type="text"/>
* User name (newly self-chosen)	<input type="text"/>
* Email	<input type="text"/>
* Telephone (mobile)	<input type="text"/>
* Date of Birth	<input type="text"/>
* Monthly salary	<input type="text"/>
Hobbies, Interests	<input type="text"/>
Sort Code	<input type="text"/>
Account number	<input type="text"/>
Account holder (name)	<input type="text"/>

☐ I agree with the Terms and Privacy Policy. *

☐ I would like to subscribe to the SilverDisc Email Newsletter.



Your Order

I would like to order the free-delivery products marked below.
I will receive an additional **€7 discount** today from the given prices.

<input type="radio"/> Gran Torino	€ 12,95
<input type="radio"/> Hannah Montana - Der Film	€ 17,95
<input type="radio"/> 24 - Season 7 (6 DVDs)	€ 44,95
<input type="radio"/> Ice Age 3: Die Dinosaurier sind los (& Digital Copy)	€ 10,95
<input type="radio"/> Illuminati	€ 15,95
<input type="radio"/> Ice Age 1, 2 & 3 (3 DVDs, inkl. Digital Copies)	€ 22,95
<input type="radio"/> Stargate Atlantis - Season 5	€ 37,98
<input type="radio"/> David Garrett - David Garrett Live - In Concert & in Private	€ 19,95
<input type="radio"/> X-Men Origins: Wolverine (Extended Version inkl. Digital Cop	€ 17,95
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<input type="radio"/> Schöne Bescherung	€ 10,95
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<input type="radio"/> Star Wars - Trilogie, Episode IV-VI (3 DVDs)	€ 27,95
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<input type="radio"/> Twilight - Bis(s) zum Morgengrauen (2 DVDs)	€ 17,95
<input type="radio"/> Loriot - Vollständige Fernseh-Edition (16 DVDs) inkl. 50 noch	€ 32,95
<input type="radio"/> Star Trek	€ 17,95
<input type="radio"/> Harry Potter und der Halbblutprinz (1 Disc)	€ 15,97
<input type="radio"/> Slumdog Millionär	€ 16,95
<input type="radio"/> Hangover	€ 12,95
<input type="radio"/> Krabat (Einzel-DVD)	€ 12,95

Delivery Choices

☐ nine-day postal delivery

☐ four-day postal delivery (quick delivery)

For the quick delivery we need your identification details:

Document: Number:

☐ Gift-wrapped (plus €3)

Your Details

Required fields are marked with an asterisk.
You can pay by direct debit or in cash to the experiment supervisor.

Sex (m/f)	<input type="text"/>
* First name	<input type="text"/>
* Surname	<input type="text"/>
* Street, House number	<input type="text"/>
* Postcode, City	<input type="text"/>
* User name (newly self-chosen)	<input type="text"/>
* Email	<input type="text"/>
Telephone (mobile)	<input type="text"/>
Year of Birth	<input type="text"/>
* Favorite color	<input type="text"/>
Hobbies, Interests	<input type="text"/>
Sort Code	<input type="text"/>
Account number	<input type="text"/>
Account holder (name)	<input type="text"/>

☐ I agree with the Terms and Privacy Policy. *

☐ I would like to subscribe to the SilverDisc Email Newsletter.



Dear Participant,

On behalf of the Technical University Berlin and the University of Cambridge, we welcome you.

Please read the instructions carefully as they include important information about today's experiment.

Scientific background: You are taking part in a joint scientific experiment by the Technical University Berlin and the University of Cambridge. Experiments such as today's help us to collect reliable data that is needed for scientific publications and for academic journals. To analyze how consumers make decisions in increasingly competitive markets we will be giving out order forms from two branches of SilverDisc in Cologne and Frankfurt, who sell their products on Amazon.de.

Experiment length: We anticipate that the experiment will take 40 minutes.

Ordering and Buying: During today's experiment you will have the possibility to buy the product of your choice from one of the two firms of your choice. The range of products is the same for both firms. You are not obligated to buy. You can also decide not to buy anything.

Product range: The order form that you will soon be given represents only a small choice of available DVDs. During the experiment you can search for as many other film titles as you wish. All available products will then be shown and you can request a new order form for these products from one of the experiment supervisors.

Once you have decided to buy a product, your order will be placed. At Amazon.de, your order will be processed and confirmed and a new customer account will be created for you for that purpose. This account will be deactivated in four weeks once the return service agreement expires. A customer account will also be created by SilverDisc. The branch you have chosen and Amazon will then process your personal data.

Price and Payment: Payment for your chosen product takes place once you have chosen your type of payment. All prices are presented on the order form and can depend on which firm you have ordered from. Delivery is free of charge.

Remuneration and Attendance Allowance: If you buy one of the products on offer you will receive a €7 subsidy. This subsidy will then be deducted from the purchasing price. Therefore, you will pay €7 less of the price given on the order form regardless of which product you buy or from which firm. You will not be given a subsidy should you choose not to purchase a product.

Your attendance allowance of €6 will be paid in cash following the experiment. In total, today's remuneration can amount to €13.

Rules and Regulations: Take note that mobile telephones are not permitted during today's experiment. Please place all mobile phones or similar devices in your pocket or bag before the session begins.

Please remain seated during the course of the experiment, even if you conclude the experiment earlier than expected.

Today's experiment consists of three stages:

Preparation: You will be given an instruction form from the experiment supervisor. At the same time you will receive two printed order forms and an overview with background information on the film titles listed. The computer at your station will guide you through the experiment. It should, however, be switched off at the present time.

Please take a moment to check that you have all the necessary material. Inform the experiment supervisor if anything is missing. Otherwise you can begin reading through.

Purchasing: After the preparation, all participants simultaneously have the chance to complete one purchase and buy a maximum of one DVD. We then request that you confirm your decision on the screen. You do not need to wait but can then continue shopping should you wish to do so. Your remuneration today is not dependent on the speed of your decision.

When buying you can decide between one of the following three possibilities: (1) Purchase one of your selected products from SilverDisc Cologne; (2) Purchase one of your selected products from SilverDisc Frankfurt; (3) No purchase. If you don't choose any of those options you will not be entitled to remuneration. Should you opt for products that are not listed on the order form you can search your computer for more titles. The experiment supervisor will then give you a new order form with your favoured titles.

Ordering: Once you have chosen the product you wish to buy, the order form from the firm you have selected will be shown on your monitor. Please fill out the formula online. The printed order forms are a copy of the online forms and are only for your reference. After completing the order form online, your order is legally binding.

Payment: The experiment is completed once all participants have filled out the completion questionnaire. You will then be paid for taking part in the experiment. If you choose to pay in cash, please give us the final invoice amount shown on your screen. Both firms also offer payment by bank transfer. Under University Regulations, we ask you to save your original receipts for our records.

Thank you for taking part. On behalf of the Technical University Berlin and the University of Cambridge we thank you once again for taking part in today's experiment, for reading through and for your compliance with the instructions. This study has been approved by the Ethics Committee of the University of Cambridge. Should you have any further questions please raise your hand and one of the supervisors will attend to you. If you are ready to start, then please confirm on your monitor that the experiment can now begin.

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Please fill out the following Declaration of Consent for our files:

I understand that my participation is voluntary and that I may cancel at any time without giving reasons. I have read the above description of the research and declare my consent to participate.

Name:

Date:

Signature:

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